SMALL ARMS TRAINING

By Rodney L. Pringle, MT2 Editor

SIMULATIONS PLAYING LARGER ROLE IN TROOP TRAINING FOR SMALL ARMS WEAPONS; TREND TO CONTINUE.

It wasn't long ago that small arms training for the U.S. Army and Marine Corps consisted solely of a soldier or Marine being taught how to fire an M16A2 rifle at pop up or stationary targets on a shooting range. While live fire training remains the basis for both to learn how to efficiently and effectively operate their small arms weapons, simulations have provided another means for troops to sharpen skills, improve accuracy, better train as a group under certain scenarios and reduce ammunition costs for a U.S. military that finds itself stretched to the limit. As the military looks for ways to better incorporate simulations into training to improve performance, efficiency and cut costs, many companies throughout the industry are offering products and services to help the military accomplish its goals.

SMALL ARMS WEAPONS

Small arms weapons have played an integral role in the success of the U.S. military. With the United States expected to fight more asymmetric instead of traditional foes in the future, proper training and knowledge of how to use these weapons, particularly in an urban environment, will take on even more importance. The traditional calling card small arms weapon for the U.S. military is the M16A2 rifle, or the M16. The U.S. Army purchased the first version of the rifle, the M16A1, in 1964. The M4 combat assault rifle was first used by the U.S. Army in 1997. It is the standard weapon used by some Army units, including the 82nd Airborne Division and special operations units like the Army Rangers. Other small arms weapons the U.S. military uses include the M-9 Handgun, M-24 Sniper Weapon, the M40A1 Sniper Rifle, the M249 SAW, M240 Machine Gun and the M2 Machine Gun.

SIMULATIONS IMPACT ON SMALL ARMS TRAINING

Simulations have had a tremendous impact on small arms weapons training, particularly when it comes to improving a warfighter's accuracy as well as helping the services train for certain scenarios, according to analysts. When you are dealing with an asymmetric foe, it's imperative for warfighters to not only be able to shoot accurately, but also know whom to shoot at, Garrick Ngai, an aerospace and defense industry analyst for Frost and Sullivan, told MT2.

"Back before [the U.S.] engagement in Iraq and Afghanistan, if we were practicing against the Russians or against the Soviets coming through Europe, the hordes of tanks and the Soviets coming over, we didn't really need these scenario-based driven solutions at all," Ngai said. "We didn't need them. All we needed were the targetry—one shot, one kill at a Soviet soldier. That's it. But now that we have actually moved toward Iraq and Afghanistan, asymmetric warfare for instance, you know what, the enemy isn't so clear, we don't know who is who, and we're not out in the forests or woodlands anymore. We are fighting in urban areas. That's why simulation, if you target scenario-based driven training, that's the way to go."

Dean Lockwood, a weapons systems analyst with Forecast International, told MT2 that the greatest contribution made by simulations could be the amount of money the services have saved on ammunition costs. "Probably the most important impact that [simulations] is having is, by using simulations, the services are not using ammunition," Lockwood said. "You figure over the last four years now, supplying enough ammunition has been a real issue."

For example, the U.S. Army's demand for small caliber ammunition increased from 426 million rounds in 2001 to 1.5 billion rounds in 2006, according to the Joint Munitions Command at the Rock Island Arsenal in Illinois. As far as expenditures, the U.S. government spent $688 million on ammunition last year, up from $242 million in 2001, according to the command. The most common rounds ordered were the 5.56 mm, 7.62 mm and .50 caliber, according to command officials. The ammunition costs would have been much higher if the services weren't training with simulations and instead were using live ammunition, analysts said.

Another benefit of simulations is that it has helped "the logistics of training," according to Ngai. "The simulation solutions have been very light and deployable," he said. "They can be deployed in a trailer or shipped overseas. It really helps the logistics of training your soldiers. You don't have to come back to the states and do it here. Again, it keeps your skills very fresh and busy, that's a good thing, and it saves a lot of costs as well, too."

Simulation has also helped keep training standards consistent, analysts said, because troops can receive the same training instruction wherever they may be. If they depended solely on human instructors for training, each service member could receive different levels of training based on the experience and skill level of the trainer as well as the teaching structure in place, Ngai said.

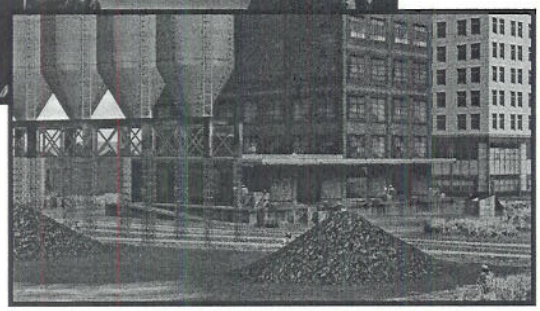
ARMY SIMULATION USE AT PEO STRI

The U.S. Army has increasingly turned to simulations to improve small arms weapon training for its soldiers. In January 2007, the U.S. Army Program Executive Office, Simulation Training and Instrumentation Command awarded a $24 million contract to Cubic Corporation for its Engagement Skills Trainer 2000 (EST 2000) training system and other defense training systems. EST 2000 teaches marksmanship skills, squad-level collective defense and judgmental "shoot-don't shoot" tactics and trains soldiers in the use of small arms, as well as the 50 caliber M-2 machine gun and the 40 mm Mark-19 grenade launcher. The enhanced Warrior Skills version of EST 2000 allows mounted or dismounted soldiers to engage enemy targets as they move through virtual urban environment that replicates current combat conditions and includes simulated improvised explosive devices (IEDs).

Cubic's Simulation Systems Division in Orlando, Fla., produces and manufactures the complete small arms training systems for both the EST 2000 and the Warrior Skills version. Each EST 2000 system consists of an instructor/operator station, a high-resolution projector, a detection system, an air compressor, a screen, cabling and hoses to connect to lane position weapon boxes and the associated small arms weapons. Systems can be interconnected to provide 5-, 10- and 15-land firing positions. Cubic offers a fully self-contained deployable shelter to house and train EST 2000, with the shelter being equipped with lighting, heating and air conditioning.

Terry Fiest, director of business development for Army Systems at Cubic Simulation Systems Division, told MT2 that what makes the EST 2000 and WST systems unique are that each are built to U.S. Army requirements. "We are the only system that has ever been built that was built to an Army standard," Fiest said. "All of our competitors out there have built training systems, but they've built the training systems on their own merit. They have never had the luxury of sitting down with the [Army] infantry school and discussing the infantry requirements and then making a system fit the requirements. There are a lot of trainers out there that you can fire weapons with and you can do all that training, but you don't get the accuracy and you don't get the ballistics that we offer on our system."

U.S. Army soldiers engaging enemy BMP's on Cubic Corp.'s EST 2000 in Collective mode. The company built the terrain to resemble Afghanistan.



Cubic Corp.'s EST 2000 in the Collective mode showing a rock quarry containing numerous enemy soldiers – a target-rich environment.

The EST 2000 is used by Army, National Guard and Reserve units throughout the United States, Europe, Korea, Afghanistan and Iraq, Fiest said. WST systems have been used by the Army, National Guard, the Air Force and the Department of Energy.

ISTM FOR USMC

The United States Marine Corps has long prided itself on the axiom that all Marines are "riflemen first." That's why recruits spend several weeks of their boot camp learning how to fire small arms weapons on live ranges. However, there has been movement in the service to include more simulation technology to improve small arms weapon training. Since 1993, the USMC has used an Indoor Simulated Markmanship Trainer to assist Marines in small arms weapons training. The ISMT program is an interactive audio-video weapons simulator that provides the capability for Marines to conduct standards-based training in basic and advanced marksmanship. It also allows Marines to judge which targets to engage, improve combat marksmanship and select employment tactics for more than 17 weapons and the use of supporting arms, including mortars, artillery, naval surface fire support, and rotary-wing and fixed-wing close air support. ISTM and ISTM-XP, an updated version of the earlier product, are produced by Meggitt Defense Systems FATS/Caswell, which has offices in Georgia and California.

Terry Bennington, a retired USMC sergeant major and project officer for the Technology Division, Training and Education Command, Quantico, Va., told MT2 that simulations and the ISTM have had a major impact on the way the Marine Corps approaches small arms weapons training. "[Simulation] has had a huge impact, especially when you consider that we have deployed basically every Marine Corp reserve unit that we have," Bennington said. "Every reserve unit out there has an ISMT system and they were totally dependent on that ISMT to prepare their Marines to deploy to OIF and OEF. Because in some cases, the reserve units out there don't have ranges that they can get to. So they are totally dependent on that ISMT system to effectively do their training on weapons. Right now, I'm in a position where I can't field enough of them. I just have a huge request for them."

The Marine Corps has over 600 ISTM systems fielded throughout the service, according to Bennington. To be qualified with a weapon, Marines still have to go to the rifle range, he said. "You still have to go to the range and put steel on target," Bennington said. "Simulations currently are a reinforcer." This past year, the Marine Corps integrated Rifle Combat Optics into its ISTM-XP trainers. In the next several weeks, the service will award a contract for a simulation Combat Convoy Simulator, Bennington said.

COMPANIES IMPACTING SMALL ARMS SIMULATION TRAINING

There are several companies offering simulation products that have helped militaries around the world improve small arms weapons training for their soldiers. MPRI, an L-3 Communications company, offers Laser Marksmanship Training System (LMTS) targets and accessories to include BEAMHIT, the Laser Collective Combat Advanced Training System (LCCATS) and SafeShot products. LMTS supports realistic and comprehensive handgun, rifle and machine gun marksmanship instruction, helps to identify individuals in need of remedial training and facilitates that training as need prior to qualification firing, according to the company. LMTS is comprised of an eye safe laser that fits into the barrel of the firearm with no modification. An electronic target acts as a receiver for the laser bullet. When the hammer falls, a laser pulse is emitted and hits are registered with precision, according to the company. As many as ten targets may be linked with one personal computer

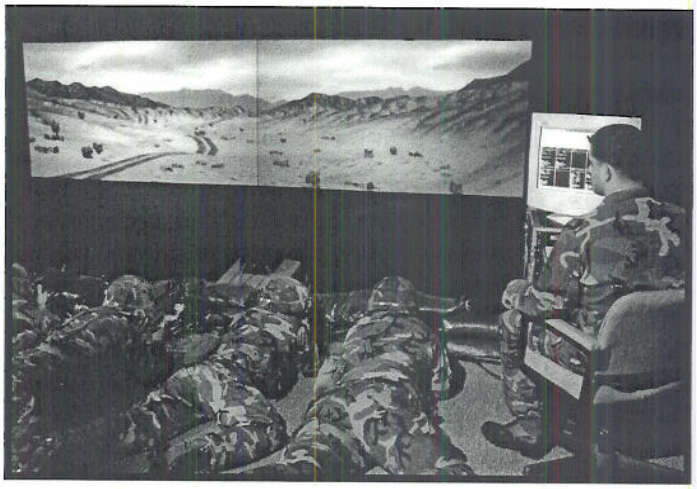
for real time display of shots, time of fire, dispersion of the group and mean point of impact. LMTS supports training on most military small arms including the M9, all variants of the M16, M16A4, M4, the M249 and M240 machine guns and the M24 7.62 mm sniper rifle. "LMTS is designed to be an integral part of a well-rounded small arms marksmanship program," said Sid Oaksmith, vice president of operations for MPRI. "The systems are not intended to replace live fire, but serve as training devices to make live fire training more productive."

Besides the ISTM and ISTM-XP systems, Meggitt Defense Systems FATS/Caswell also offers a Bluefire Wireless Weapon Simulator and System Controlled Weapons. The FATS Bluefire Wireless Weapon Simulator uses commercial wireless Bluetooth technology to communicate with the training system. For weapons with a recoil action, the action is brought about by using a rechargeable magazine of compressed gas. The Bluefire weapon simulators can also be used in conjunction with other FATS system controlled weapon simulators without requiring any system modifications, the company said. Wireless weapons include configurations of the Sig P226, Beretta M9, Walther 99, M4 and SRS Rifle (M16 type). The company's System Controlled Weapon Simulators are high fidelity simulators built to tolerances within 10 percent of the live weapons weight and center of gravity.

"We are constantly pushing the limits of virtual training to align our product development with reality," Dietrich Volkland, a spokesman for MDS FATS/Caswell, told MT2. "Our customers such as the U.S. military demand that we deliver the next level, the next tool to support their warfighting superiority. By increasing our weapons' portability, and allowing trainees and teams to move more freely within their training environments, we improve combat readiness."

VirTra Systems Inc., with offices in Arizona and Texas, offers an immersive small arms training simulator for asymmetrical warfare, using a 360-degree multi-screen, high-definition simulator that completely surrounds small teams, squads or even convoy vehicles in the scenarios. VirTra offers a range of tether-less recoil systems for most military weapons applications, according to the company. The company's products also include SAT military marksmanship qualification courses to 1000 meters. Clients for VirTra Systems' situational firearms training systems include the Army, Navy, Air Force, Marines, the Department of Defense, and national and international law enforcement agencies, according to the company.

Saab Training USA, a subsidiary of Saab Training Systems, provides laser simulators that can be used for all types of direct firing weapons. From small arms and shoulder launched anti-armor weapons to main battle tanks, these laser simulators are developed from a generic set of components and are, therefore, easy to adapt to new or future applications, according to the company. Saab Training USA also offers "man worn" vests or Personnel Detection Devices (PDDs). AnthroTronix of Silver Spring, Md., is working with the Marine Corps to develop a multi-room, mixed-environment Battle Simulation System to provide a realistic combat atmosphere for all Marines and sailors deploying to Iraq. General Dynamics C4 Systems offers Virtual Warrior, a configurable set of hardware and software components enabling Individual Combatants (ICs) to participate in a simulation environment, while also offering the ability to control the simulation and capture event data for analysis and After Action Review (AAR).



U.S. Army soldiers firing on a qualification range that simulates the one at Fort Benning, Ga. EST 2000 is in the Marksmanship mode.

As far as live fire training aids, Advanced Training Systems Inc., in St. Paul, Minn., has several products to assist small arms weapons training, including permanent pneumatic shooting ranges, portable tactical target systems, stylus wireless range control, running man (moving) target systems, modular shoot houses and ballistic facades and 3-D simulation systems.

U.S. Military's Future Simulation Needs

With training needs changing daily, industry can best help the U.S. military accomplish its training goals by providing realistic simulation products that help fill in the gaps between available and needed technology, several military officials told MT2. Bennington said he'd like to see industry "fuse current emerging and future live and virtual technologies in order to create a fully immersive training environment that replicates as closely as possible the effects and conditions of the battlefield that would allow a dismounted infantry squad to effectively train in the wide spectrum of tasks necessary to execute a full range of operations."

"Right now, our ranges and our training areas are busier than they've ever been," Bennington said. "We have modified a lot of our training events in order to fulfill requirements that the warfighting Marine needs out there right now. Simulations need to parallel it in order to [fill in] the gaps. As you know, simulations cannot do everything. But simulations can do a lot of things. But everything that we do within simulations has got to be built that identifies a task within our training requirements manuals. And if you don't do that, then what you are really building is a game. And we're not building games. We are building simulations."

Simulation has an important purpose in small arms weapons training, but it will never replace the real thing, Lockwood said. "Despite the technological advances, [simulation] is not and never will be a perfect substitute to getting out there and doing it for real, but it gets you a lot closer anyway," he said. "It gets you to some reasonable level." ★

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